Patent Application Publication No. 2001/0020217 to Matsuno. The rejection is respectfully traversed.

As discussed during the personal interview, neither Maruko or Matsuno, whether considered alone or in combination, disclose or suggest each and every feature recited in the rejected claims. For example, the combination of references fails to disclose or suggest a device for controlling a braking force of a vehicle, the device comprising ... a boost-reducing control portion that controls the boosting control portion so as to reduce the braking force when a steering operation is executed by a driver of the vehicle as compared to a braking force to be generated when no steering operation is executed, thereby reducing the braking force and allowing the driver to avoid a collision through the steering operation executed by the driver, wherein the boost-reducing control portion controls a reduction in the braking force based upon a lateral force on a steered wheel estimated from the steering operation by the driver and a motional condition of the vehicle, as recited in claim 1.

It is admitted in the Office Action that "Maruko does not explicitly teach providing different braking force boosting and boost-reducing control portion, and does not explicitly disclose controlling a reduction in the braking force based on a lateral force on a steered wheel and a motional condition of the vehicle." In spite of the admission that Maruko fails to disclose the features recited in claim 1, it is alleged in the Office Action that it would have been "an obvious matter of design choice" to implement the control taught by Maruko "in separate control sections for increasing or limiting brake force respectively in order to fit the processing capability and work load of the controller." Thus, it appears from the Office Action that claims 1-3, 5 and 6 are rejected as being obvious over Maruko singularly, as well as in combination with Matsuno.

Regarding the allegation that it would have been an obvious matter of design choice to implement the controls of Maruko in "separate control sections" as alleged in the Office

Action, a feature can be considered an obvious design choice only in cases where a rearrangement of parts that does not modify the operation of the device as suggested by the prior art (see MPEP §2144.04). Thus, there can be no obvious design choice allegation in this case because Maruko is admitted as not disclosing a boost-reducing control portion that controls a reduction in the braking force based upon a lateral force on a steered wheel estimated from the steering operation by the driver and a motional condition of the vehicle. In other words, there can be no rearrangement of parts that do not exist. Thus, the feature admitted as being missing from Maruko cannot be considered an obvious design choice as alleged in the Office Action.

Furthermore, because Maruko does not provide any structure with which to detect a lateral force on a steered wheel, it would be impossible for one of ordinary skill in the art to control a reduction in the braking force of a boost-reducing control portion based on a lateral force on a steered wheel. Therefore, the allegation in the Office Action that implementation of Maruko would be an obvious matter of design choice and require only routine skill in the art is incorrect. There can be no implementation of a control that does not exist in the reference.

It is further alleged in the Office Action that Matsuno teaches "adjusting the target brake force based upon the lateral acceleration, the steering angle and the motional condition of the vehicle" (emphasis added). Matsuno discloses automatically braking a vehicle based on a distance between the vehicle and the obstacle, the vehicle speed and a road gradient. The automatic brake control section calculates a target braking force at least based on the target yaw rate and selects an object wheel to be braked (Abstract of Matsuno). After the target yaw rate is established, a control program goes to step S112 where the automatic brake control 15j calculates the target moment M_z based on the steering wheel angle θ_h, the lateral acceleration G_y, the vehicle speed V and the target yaw rate and based on the target moment, the target braking force FB is calculated. Based on the actual yaw rate and the target yaw moment, the wheel to be braked is selected and the vehicle behavior control is formed (paragraph [0069]).

In other words, in Matsuno the adjustment of braking forces is for producing a yaw moment around the mass center of the vehicle body by forcibly inducing a braking force imbalance among the vehicle wheels. Under these conditions, the braking force is increased to approximately its maximum level. By so adjusting the braking force, the yaw moment is induced to cause a slippage of the tires and the vehicle body. Accordingly, it is impossible that Matsuno discloses a reduction of braking forces based upon a lateral force on the steered wheels. Thus, Matsuno is silent regarding a boost-reducing control portion that controls a reduction in the braking force based upon a lateral force on a steered wheel estimated from the steering operation by the driver and the motional condition of the vehicle.

Although Matsuno clearly does not teach the recited feature, it is alleged in the Office Action that it would have been "well known" that the lateral force can be determined from the lateral acceleration and the steering operation of the vehicle. However, the Office Action provides no evidence or support for the allegation of such "well known" determination of a lateral force.

It is never appropriate to rely solely on "common knowledge" in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based. See MPEP §2144.03 citing *In re Zurko*, 258 F.3d. 1379, 1385, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). As stated in §2144.03 of the MPEP, "it would not be appropriate for the Examiner to take official notice of facts without citing the prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well known."

In this case, it is admitted that Matsuno only teaches adjusting a target brake force based on lateral acceleration, steering angle and the motional condition of the vehicle. Further, as discussed above, Matsuno teaches inducing the yaw moment to cause a slippage of the tires and the vehicle body. Thus, Matsuno fails to disclose the claim feature of reducing the braking force in a boost reducing control portion based upon a lateral force on a steered wheel estimated from the steering operation by the driver and a motional condition of the vehicle. As Matsuno is silent regarding this feature, the reference cannot be relied upon to support an allegation of common knowledge, or that such a feature would have been "well known". As pointed out in *Zurko*, and reiterated in *In re Sang-su Lee*, 277 F.3d. 1388, 1345 (Fed. Cir. 2002), "deficiencies of the cited references cannot be remedied by the Board's general conclusion about what is 'basic knowledge' or 'common sense'. The Board's findings must extend to all material facts and must be documented on the record, lest the "haze of so-called expertise" acquire insulation from accountability. 'Common knowledge and common sense', even if assumed to derive from the agencies' expertise, do not substitute for authority when the law requires authority." Thus, asserting that such a feature is well known requires support on the part of the Patent Office and a mere allegation will not suffice to render the subject matter of the claim obvious. Because the reliance on such a "well known" feature is hereby traversed, Applicants point out that the Examiner must provide documentary evidence in the next Office Action if the rejection is to be maintained (see MPEP §2144.04, 37 C.F.R. §1.104(c)(2)).

Because a combination of references fails to disclose or suggest each and every feature recited in the rejected claims, withdrawal of the rejection of claims 1-3, 5 and 6 is respectfully requested.

Claims 7 and 8 are rejected under 35 U.S.C. §103(a) is unpatentable over Maruko. The rejection is respectfully traversed.

Maruko fails to disclose or suggest a device for controlling a braking force of a vehicle, the device comprising a braking force boosting control portion that increases the braking force in response to a detection of a first possibility of a collision with an obstacle in a driving course of the vehicle; and a boost-reducing control portion that controls the boosting control portion so as to reduce the braking force when a steering operation is executed by a driver of the vehicle as compared to a braking force to be generated when no steering operation is executed as started from the detection of the first possibility until a second possibility that the collision with the obstacle is inevitable solely by either of a steering operation and a braking operation by the driver is detected, the boost-reducing control portion canceling the reduction of the braking force when the second possibility is detected, or the similar features recited in claim 8.

It is alleged in the Office Action that Maruko teaches adjusting the boosting the brake control according to the status of an eminent collision at paragraph [0087]. However, paragraph [0087] of Maruko discloses increasing the braking pressure based on the target deceleration rate Gx*, i.e., the deceleration rate needed to avoid the host vehicle from being brought into collision contact with the preceding vehicle (or the frontly located object) (see paragraph [0068]). Thus, although Maruko does disclose increasing the brake pressure based on the rate of deceleration between the host vehicle and the object, such a disclosure does not teach or suggest a boost-reducing control portion that controls the boosting control portion so as to reduce the braking force when a steering operation is executed by a driver of the vehicle as compared to a braking force to be generated when no steering operation is executed, as started from the detection of the first possibility until a second possibility that the collision with the obstacle is inevitable solely by either of a steering operation and a braking operation by the driver is detected, the boost-reducing control portion canceling the reduction of the braking force when the second possibility is detected.

It is alleged in the Office Action that the LC flag described in paragraph [0054], and shown in Fig. 4 of Maruko, teaches cancellation of the boost reducing control when collision is inevitable by steering. However, the LC flag simply indicates the driver's intention for lane changing, and not whether a collision is inevitable solely by any available steering operation. Rather, as shown in step 57 of Fig. 4 of Maruko, a judgment is made of whether the steering angle δ is higher than the threshold α or not, wherein the steering angle is disclosed as the current value. The current steering angle δ may be lower than the threshold α even when a collision is avoidable by only slightly increasing the steering angle and the braking force would be prematurely increased or inappropriately applied. Thus, the reliance on the setting LC flag as teaching cancellation of the boost reducing control when collision is inevitable is inappropriate.

Moreover, Maruko fails to disclose the claim feature of judging whether or not a collision is avoidable solely by a braking operation. Rather, Maruko merely refers to a required deceleration Gx*. The reference value Gx_0* shown in Fig. 3, refers to a value slightly lower than a deceleration rate created by a driver's action during normal braking (see paragraph [0039]) and not any available deceleration in the system. Thus, Maruko merely discloses accounting only for current conditions in the vehicle, such as a time-to-collision being determined independently of available steering or braking operations, and therefore does not contemplate using predictions relating to the steering or braking ability of the vehicle. Accordingly, Maruko fails to disclose the claim features as suggested in the Office Action.

Further evidence of Maruko's failure to render the rejected claims obvious is shown in Fig. 3 of Maruko wherein a host vehicle speed Vm, a relative distance L, and a relative speed dL/dt between the host vehicle and an object are obtained. Then, based on these factors, a deceleration Gx*, required to stop the host vehicle before the obstacle is estimated. If Gx* is larger than Gx_0*, which is a deceleration that is produced by a normal braking operation, and if the flag LC equals zero, i.e., no lane changes intended by the driver, the master pressure in the braking system, not in the wheel cylinders, is slightly increased. In this way, the depression of the brake pedal provides higher brake pressures into the wheel cylinders in a normal braking operation. Thus, Gx* merely indicates the deceleration value required to stop the host vehicle before colliding with the obstacle and does not disclose or suggest a collision is avoidable by a braking operation available in the host vehicle or the estimation of the possibility of a collision. Rather, as shown in Fig. 4, when determining the state of the LC flag, the time-to-collision (TC) is first determined based upon the relative distance L and the relative speed dL/dt. TC indicates the time interval that the host vehicle has to reach the object and does not indicate whether or not a collision is avoidable by a braking operation, and/or steering operation available in the host vehicle, i.e., the possibility of a collision.

As discussed above, the LC flag simply indicates a driver's intention for lane changing and does not indicate whether a collision is inevitable solely by an available steering operation. For example, as previously pointed out at step S57, a determination is made of whether the current steering angle δ is higher than a threshold α. The actual determination of α in step S56 is described at paragraph [0054] which recites that in the timing charts shown in Figs. 8A and 8B, the steering angle δ tends to decrease as time-to-collision TC increases or lengthens (see Figs. 8A and 8B which show lines $\delta 1$ and $\delta 2$, as well as $\theta 1$, $\theta 2$, go up and down with time. Thus, from the description at paragraph [0054] and Figs. 8A and 8B, the values of δ and θ vary with time which relate to the driver operations, i.e., the driver will have to steer the vehicle more radically as the obstacle and vehicle become relatively closer to one another. Therefore, there is no disclosure or suggestion of any type in this embodiment of

Maruko which refers to the possibility of the collision and the lateral force dependent upon braking operation.

Additionally, as shown in the second embodiment in Fig. 14, the deceleration Gx* required to stop the host vehicle before the obstacle is based upon a host vehicle speed Vm, a relative distance L and a relative speed dL/dt. If Gx* is larger than Gx_0* and if the LC flag equals zero, supplementary braking application is applied without obtaining Gx*. Thus, there is no consideration of the possibility of the collision and the lateral force dependent braking operation in this embodiment.

If Gx* is larger than Gx_o* and if the LC flag is set to 1, supplementary braking application is applied and the braking force is increased as TC and/or a relative angle θ between the host vehicle and the object increases. Thus, the TC dependent braking operation when the LC flag is set to 1 merely indicates that when the driver intends to change course, braking is reduced. Support for this is shown at least at paragraph [0090] which recites that the programmed characteristic curves shown in Figs 15 and 16 are based upon the assumption that the longer the time-to-collision TC and/or the greater the relative angle θ, the stronger the driver's intention for lane changing. Thus, this embodiment does not disclose or suggest determining the possibility of a collision and the lateral force dependent braking reduction in order to ensure the cornering force during a pre-crash braking operation. Additionally, even were Maruko combined with the disclosure of Matsuno which teaches a yaw moment of the vehicle generated by the braking force and balance, the combination references does not disclose or suggest the claimed subject matter.

It is further alleged in the Office Action that Maruko "suggests canceling the reduction of the braking force" as recited in the rejected claims. To support the rejection, the Office Action relies on paragraph [0088] and the equation contained therein for this suggestion. However, compensating for the target braking pressure as in the equation of paragraph [0088] relies on the time-to-collision dependent gain k_1 and a relative angle dependent gain k_2, as well as the target braking pressure to calculate the compensated target braking pressure.

By choosing among certain steps shown in the flowcharts discussed above, it appears that the reference is not being considered "as a whole". In assessing the differences between the prior art and the claimed subject matter, both the claimed invention and the references must be considered as a whole to prevent an evaluation of the invention on a part-by-part basis. Without this important requirement, an obviousness assessment might successfully break an invention into its component parts, then find a prior art reference corresponding to each component. This line of reasoning would import hindsight into the obviousness determination by using the invention as a roadmap to find its prior components. *In re* Ruiz *v AB Chance Co.*, 357 F.2d 1270, 1275 (Fed. Cir. 2004). Thus, Maruko does not disclose or suggest any of the features recited in the rejected claim. Accordingly, withdrawal of the rejection of claims 7 and 8 under 35 U.S.C. §103(a) is respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-3 and 5-8 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

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